Lambda Expressions Workshop Solutions

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Sorting a vector

- Write a function that takes a vector of int as argument and prints out its elements. Use a range for loop
- Write a program that displays the elements of a vector
- Modify your program to sort the elements in descending order, with the largest element first. Use a suitable standard algorithm with a lambda expression
- Display the elements of the vector again

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Generalized capture with initialization

- Explain what the following code does

```
int y = 1;
[y = y+1](int x) { return x + y; };
cout << y << endl;
```

- What will be the result of calling this lambda with argument 5?
- What will be displayed for the final value of y?
- Write a program to check your answers

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Mutable lambda

- Consider the code on the next slide
- After executing this code, which of the following gives the resulting values of x, y and z be?

  x = 42, y = 99, z = 0

  x = 42, y = 99, z = 141

  x = 42, y = 99, z = 145

  x = 43, y = 100, z = 143

  x = 44, y = 101, z = 145

  x = 44, y = 101, z = 141

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Mutable lambda

- This code creates a lambda expression, stores it in the variable lam and evaluates it twice

```
int x{42}, y{99}, int z{0};

auto lam = [=,&z]() mutable { ++x; ++y; z = x + y; };
lam();
lam();
```

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Mutable lambda

- Write a program to check your answer. Explain the results
  - The lambda expression is mutable. This means that variables inside the lambda expression can be modified.
  - x and y are captured by value. This means that the x and y variables inside the lambda expression are copies of the x and y variables in the outer scope
  - z is captured by reference. This means that the z inside the lambda expression is a reference to the z variable in the outer scope.
  - The local variables x and y will be incremented. These incremented values will be used to calculate z
  - Modifications in the lambda expression will affect the variable z in the outer scope, but only the lambda's copies of x and y will be modified

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